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TECHNICAL REQUIREMENTS AND PERFORMANCE SPECIFICATIONS FOR

RAPID
ALIGNMENT DEVICE FOR MICROSTEREOSCOPE

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1. INTRODUCTION:

These specifications describe the technical requirements and performance to be met in the fabrication of a monocular rapid alignment device for microstereoscopes.

2. CONCEPT:

2.1. Purpose - This instrument will facilitate and improve the process of aligning stereo imagery to be viewed through a microstereoscope.

2.2. Scope - The scope of this contract will be the design and fabrication of an operational rapid alignment device for microstereoscopes.

3. REQUIREMENTS:

3.1. General Configuration

3.1.1. Overall dimension of the device shall be kept within the limits of 4 1/2 inches wide, 4 inches high, and 3 inches deep.

3.1.2. Weight of the device shall not exceed 3 1/2 pounds. Every effort shall be made to keep the device as light in weight as possible.

3.2. Optical System

3.2.1. Quality

3.2.1.1. The device shall not reduce the resolution of the instrument with which it is used by more than 10%.

3.2.1.2. With uniformly illuminated fields of view, the device shall not reduce the total light level transmitted by both eyepieces of the instrument with which it is used by more than 60%.

3.2.1.3. The device shall not reduce the field of view of the instrument with which it is used by more than 5%.

3.2.2. Focus

3.2.2.1. The device shall not defocus the image of the system with which it is used.

3.2.2.2. A focus adjustment shall be provided in the viewing eyepiece and in both input tubes of the device.

3.2.3. Magnification

3.2.3.1. The device shall not change the magnification range of the instrument with which it is used.

3.2.4. Image Rotation

3.2.4.1. The device shall not change the orientation of the image as seen in the instrument with which it is used. If the device has a required mounting direction or orientation to prevent image rotation, the device shall be keyed so as to allow only that one mounting, or the required orientation shall be clearly identified.

3.3. Construction

3.3.1. Mechanical

3.3.1.1. The device shall be compatible with the following existing anamorphic eyepiece systems:

(a) The [] anamorphic eyepiece prototype for use on the [] Zoom 70 microstereoscope equipped with [] 10X wide field eyepieces.

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(b) The [] advanced anamorphic eyepiece prototype for use on the Zoom 70 equipped with [] 10X wide field eyepieces.

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(c) The [] advanced anamorphic eyepiece for use on the [] High-Power Stereoviewer equipped with [] 6X compensating eyepieces or [] 10X compensating, wide field, high eye point eyepieces.

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3.3.1.2. In use, the device shall be easily connected to the anamorphic by means of a quick connect mechanism. After alignment of a stereo pair has been achieved, the device shall be conveniently removed by means of a quick disconnect mechanism. Connection and removal of the device shall not alter the settings of the anamorphic adjustments.

3.3.1.3. To the extent possible, location in space of the eyepiece, when the device is in use, shall be at a comfortable viewing height for a seated operator.

3.3.1.4. The device shall incorporate a means of adjusting the spacing of the two optical systems of the device at the point of attachment to the anamorphic eyepieces. The purpose of the adjustment is to allow any given interpupillary distance setting of the anamorphic eyepieces within the range of 50-75mm when attaching the alignment device to the eyepieces.

3.3.1.5. All non-mating external surfaces shall be painted with black semi-gloss enamel. All non-reflecting and non-transmitting internal surfaces shall be coated with non-reflecting black material.

3.3.1.6. Structural rigidity of the device shall be sufficient to withstand the repeated jarring resulting from removal of the device from the anamorphics and being stored on convenient nearby surfaces.

3.3.1.7 All hardware (screws, bolts, etc.) shall be of American Standard sizes with a minimum of types and sizes used.

3.3.1.8. All surfaces shall be of a corrosion-resistant type or are to be suitably treated for protection against corrosion.

3.3.1.9. Wherever possible, sealed bearings of the pre-lubricated type shall be used.

3.3.1.10. All sharp edges and corners shall be broken so as to prevent any injury to personnel handling the device.

3.3.2. Optical

3.3.2.1. Where reflective optics are incorporated within the system, they shall be mounted on three-point suspension systems for ease of alignment. Care should be taken to prevent loss of resolution due to vibration in the mirror system.

3.3.2.2. Optical elements shall be mounted with sufficient rigidity to maintain alignment and withstand the repeated jarring resulting from removal of the device from the anamorphics and being stored on convenient nearby surfaces.

3.3.2.3. Each of the two optical channels of the device shall be color coded in some manner so as to allow the operator to differentiate between right and left while using the device.

3.4. Miscellaneous

3.4.1. An operator's instruction book and a technicians maintenance book are to be delivered with each instrument. Instruction books shall be written to conform to good commercial practice.

3.4.2. Periodic inspections will be performed at the Contractor's plant by the Contracting Officer's technical representative. A preliminary acceptance test is to be performed at the Contractor's plant prior to shipping. Final acceptance testing will be performed after delivery and installation of the device at the Customer's facility.

3.4.3. One complete set of reproducible engineering drawings, consisting of an assembly and details, shall be submitted with the prototype. These drawings shall accurately describe the device in its final configuration.

3.4.4. Any special tools, fixtures, or instruments necessary for alignment and/or subsequent operation of the device shall be considered as being part of the prototype and shall be included in the cost of the prototype.

3.4.5. A carrying and/or storage case for the device shall be provided.